Cooper Lighting Solutions Photometric Lab
1121 Highway 74 South
Peachtree City, GA 30269

Scaled data based on original data using

LM-79-2019 Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Test Report Prepared for

Cooper Lighting Solutions

Brand: McGRAW-EDISON

Report Number: P631560

Luminaire Tested: GWS-SA1F-830-U-T2-W-HSS

Issue Date: 1/10/2023

Report Generated By 670246102 / DESKTOP-G35701P

Cooper Lighting Solutions Photometric Lab
1121 Highway 74 South
Peachtree City, GA 30269

Scaled Data Report

**Test Information**

| | |
|---|---|
| Test Method: | LM-79-2019 |
| Report Number: | P631560 |
| | TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-22) |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Issue Date: | 1/10/2023 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | McGRAW-EDISON |
| Catalog Number: | GWS-SA1F-830-U-T2-W-HSS |
| Description: | GALLEON WALL SLIM LUMINAIRE. (1) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II OPTICS WITH HOUSE SIDE SHIELD |
| Light Source: | (16) 3000K CCT, 80 CRI LEDS |
| Ballast/Driver: | - |

**Summary**

| | |
|---|---|
| Lumens per Lamp: | N/A |
| Luminaire Lumens: | 5013.2 lumens |
| Efficiency: | N/A |
| Efficacy: | 74.6 lumens/watt |
| Luminous Opening: | Rectangular (W 0.5' x L: 0.5' x H: 0') |
| IES Classification: | Type II - Short |
| BUG Rating: | B1 - U0 - G1 |

| | |
|---|---|
| Input Watts (W): | 67.2 |
| Input Voltage (V): | 120 |
| Input Current (Ain): | NR |
| Voltage Rise (V): | NR |
| Power Factor: | NR |
| Total Harmonic Distortion (THDi): | NR |
| Frequency (hertz): | 0 |
| Stabilization Time: | NR |
| Operation Time: | NR |
| Ambient Temperature (°C): | NR |
| Test Distance: | 28.75 FT |

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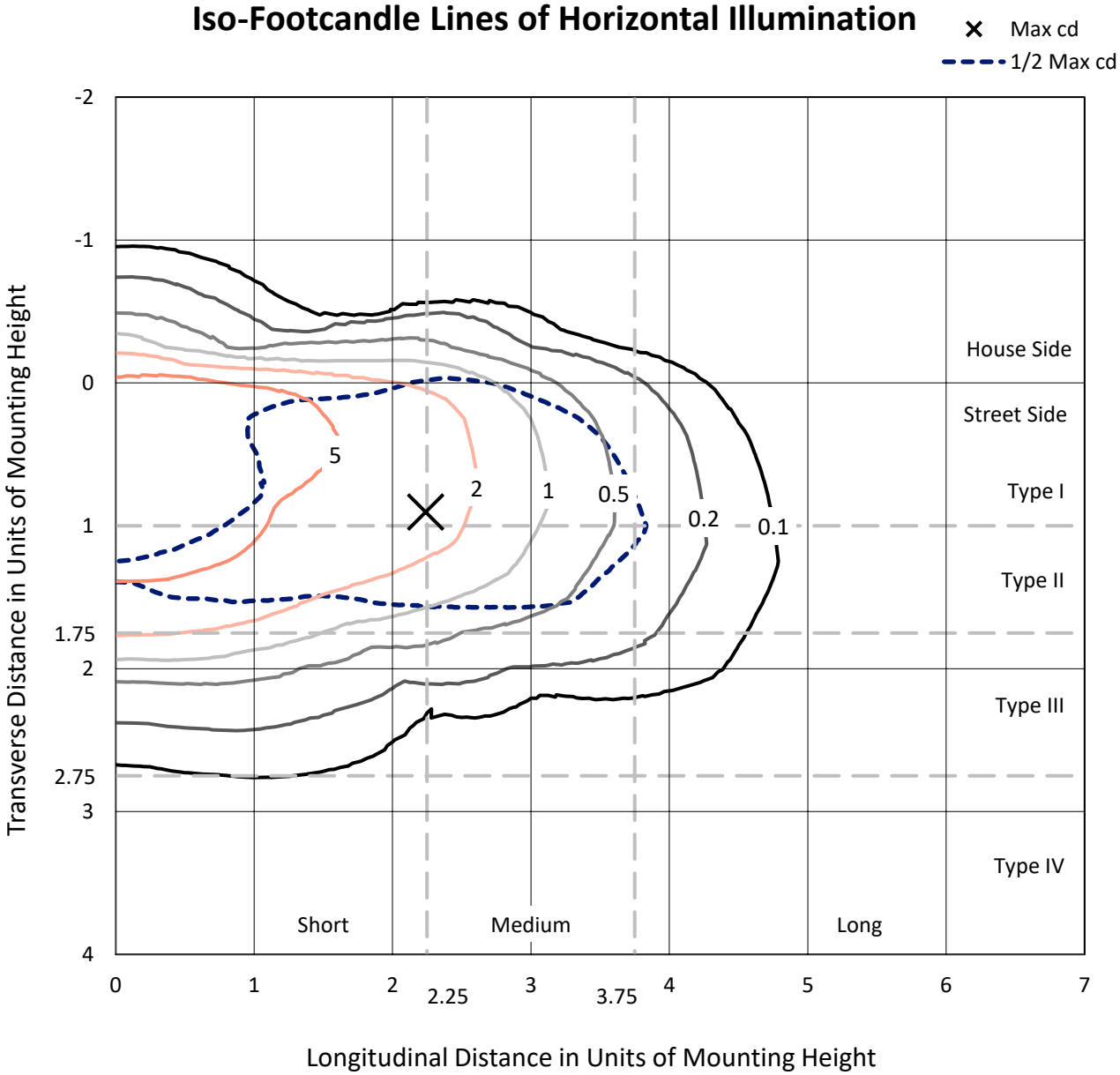
Scaled Data Report

REPORT NUMBER: P631560
CATALOG NUMBER: GWS-SA1F-830-U-T2-W-HSS

## Iso-Footcandle Lines of Horizontal Illumination




Based on 10 foot mounting height. Maximum calculated value = 9.4 fc
Type II - Short - N/A

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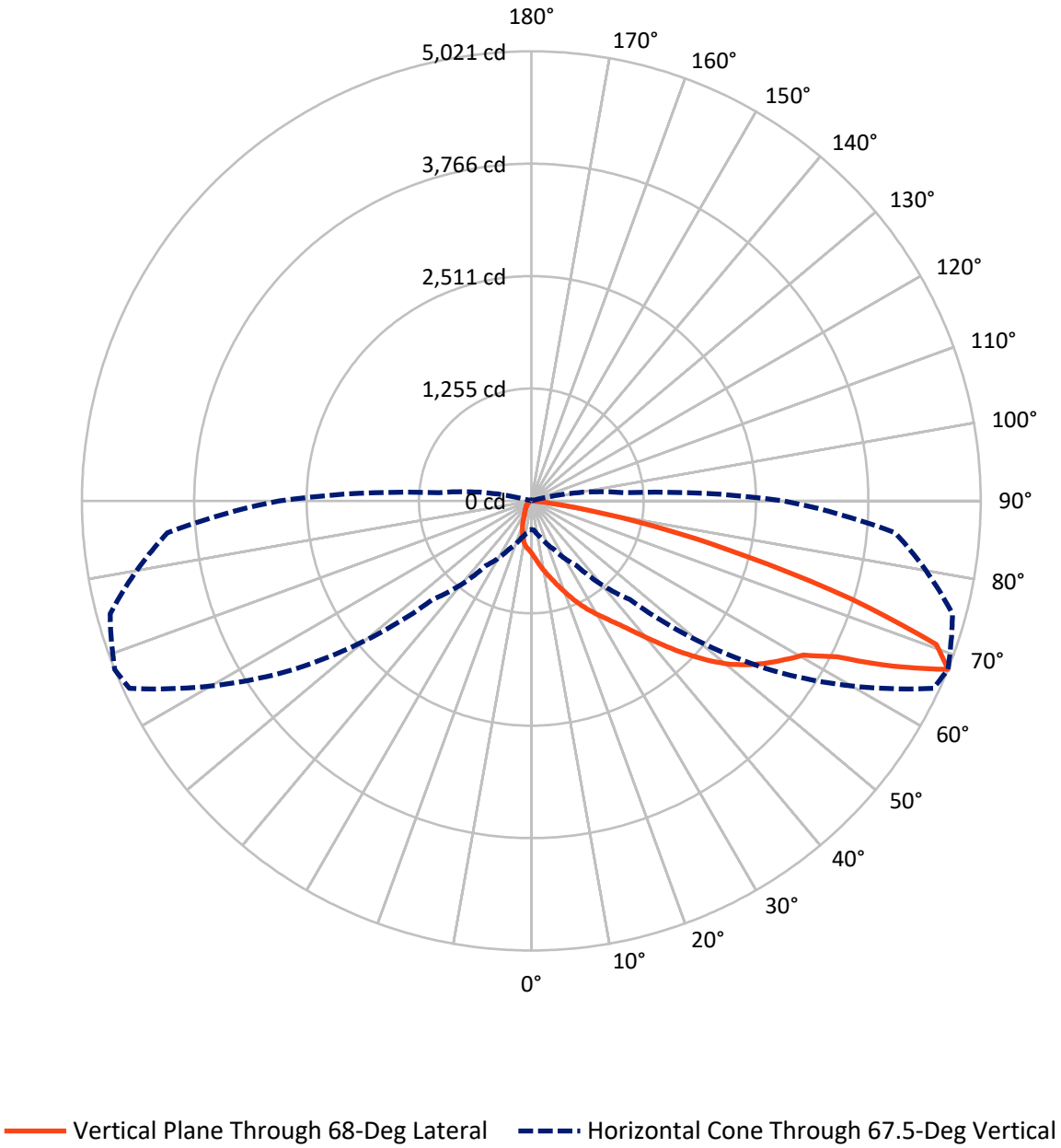
## Luminous Intensity Polar Plot



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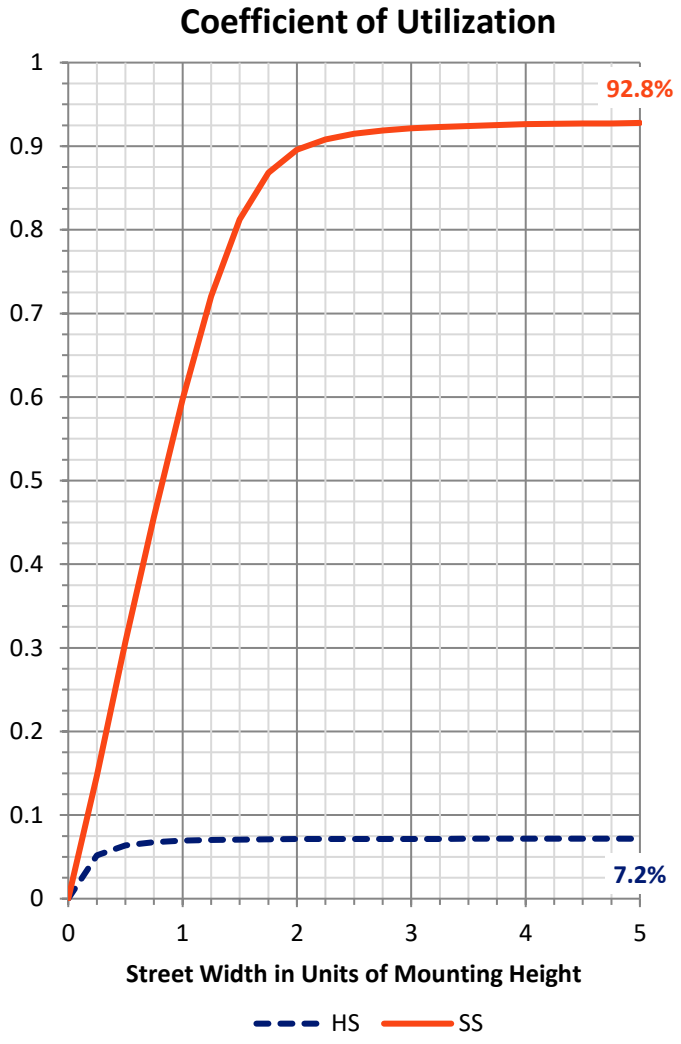
REPORT NUMBER: P631560
CATALOG NUMBER: GWS-SA1F-830-U-T2-W-HSS

**FLUX DISTRIBUTION:**

| | | Downward | Upward | Total |
|---|---|---|---|---|
| **House Side** | Lumens | 362.0 | 0.0 | 362.0 |
| | % Fixture | 7.2 | 0.0 | 7.2 |
| **Street Side** | Lumens | 4651.2 | 0.0 | 4651.2 |
| | % Fixture | 92.8 | 0.0 | 92.8 |
| **Total** | Lumens | 5013.2 | 0.0 | 5013.2 |
| | % Fixture | 100.0 | 0.0 | 100.0 |

**ZONAL LUMENS:**

| Zone | Lumens | % Fixture |
|---|---|---|
| 0°-10° | 56.9 | 1.1 |
| 10°-20° | 163.4 | 3.3 |
| 20°-30° | 280.8 | 5.6 |
| 30°-40° | 488.2 | 9.7 |
| 40°-50° | 851.9 | 17.0 |
| 50°-60° | 1284.9 | 25.6 |
| 60°-70° | 1288.4 | 25.7 |
| 70°-80° | 568.4 | 11.3 |
| 80°-90° | 30.4 | 0.6 |
| 90°-100° | 0.0 | 0.0 |
| 100°-110° | 0.0 | 0.0 |
| 110°-120° | 0.0 | 0.0 |
| 120°-130° | 0.0 | 0.0 |
| 130°-140° | 0.0 | 0.0 |
| 140°-150° | 0.0 | 0.0 |
| 150°-160° | 0.0 | 0.0 |
| 160°-170° | 0.0 | 0.0 |
| 170°-180° | 0.0 | 0.0 |
| 0°-90° | 5013.2 | 100.0 |
| 0°-180° | 5013.2 | 100.0 |



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REPORT NUMBER: P631560
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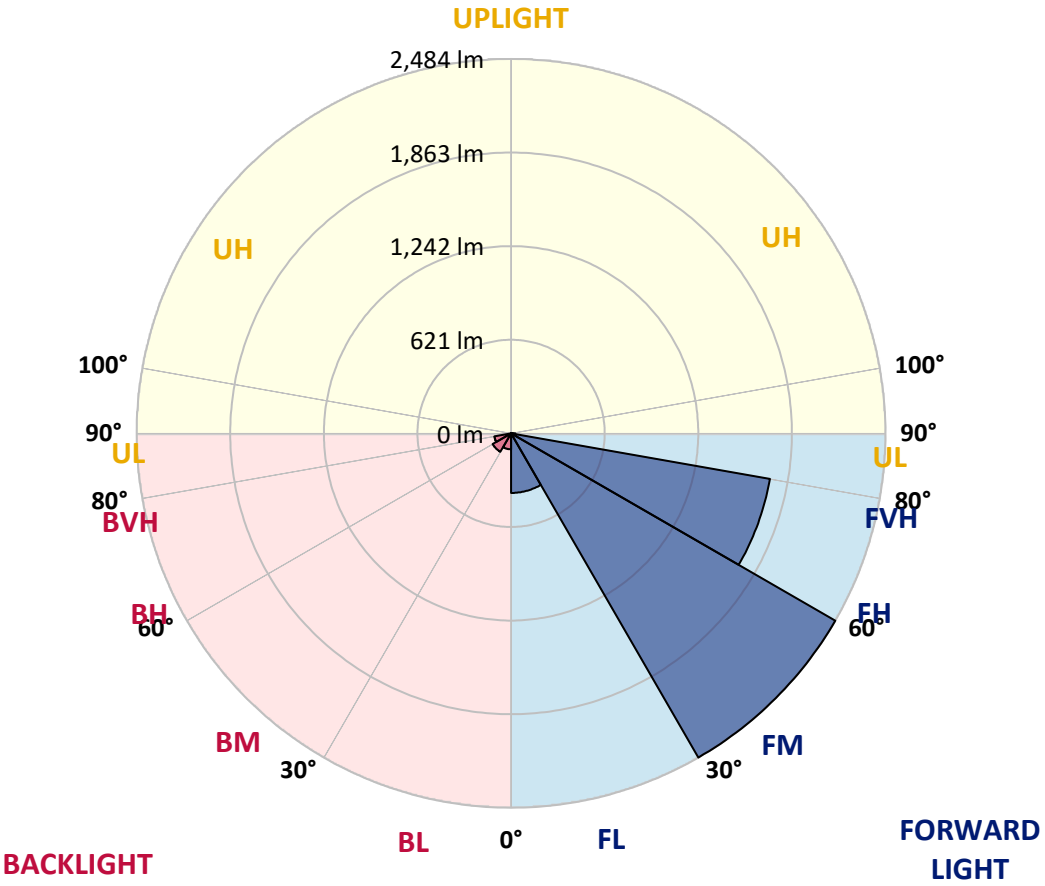
## LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:

| Zone | | Lumens | % Fixture | Zone Rating/Lumen Limit B | U | G |
|---|---|---|---|---|---|---|
| FL | (0°-30°) | 395.2 | 7.9 | | | |
| FM | (30°-60°) | 2483.5 | 49.5 | | | |
| FH | (60°-80°) | 1743.8 | 34.8 | | | G1/1800 |
| FVH | (80°-90°) | 28.7 | 0.6 | | | G1/100 |
| BL | (0°-30°) | 105.9 | 2.1 | B0/110 | | |
| BM | (30°-60°) | 141.4 | 2.8 | B0/220 | | |
| BH | (60°-80°) | 113.0 | 2.3 | B1/500 | | G1/500 |
| BVH | (80°-90°) | 1.7 | 0.0 | | | G0/10 |
| UL | (90°-100°) | 0.0 | 0.0 | | U0/0 | |
| UH | (100°-180°) | 0.0 | 0.0 | | U0/0 | |

**BUG Rating: B1-U0-G1**
Type II Short



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REPORT NUMBER: P631560
CATALOG NUMBER: GWS-SA1F-830-U-T2-W-HSS

**CANDELA DISTRIBUTION (FULL):**

| | 0° | 5° | 15° | 25° | 35° | 45° | 55° | 65° | 68° | 75° | 85° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 583.4 | 583.4 | 583.4 | 583.4 | 583.4 | 583.4 | 583.4 | 583.4 | *583.4* | 583.4 | 583.4 |
| 2.5° | 679.4 | 683.7 | 679.4 | 680.3 | 667.8 | 662.1 | 649.6 | 632.3 | *628.0* | 617.0 | 600.2 |
| 5° | 762.4 | 766.2 | 761.9 | 760.9 | 746.5 | 736.0 | 715.3 | 685.6 | *677.0* | 655.4 | 622.3 |
| 7.5° | 807.5 | 809.9 | 811.3 | 813.7 | 808.4 | 799.8 | 781.1 | 744.1 | *735.0* | 700.0 | 653.5 |
| 10° | 812.3 | 814.2 | 821.4 | 835.8 | 846.3 | 851.6 | 841.0 | 807.0 | *792.6* | 758.5 | 691.8 |
| 12.5° | 798.8 | 801.7 | 813.2 | 837.2 | 866.5 | 893.3 | 900.1 | 870.3 | *857.4* | 813.7 | 736.9 |
| 15° | 781.1 | 783.5 | 799.3 | 831.9 | 876.1 | 925.5 | 953.3 | 940.4 | *926.0* | 880.4 | 786.8 |
| 17.5° | 753.7 | 757.1 | 779.2 | 823.3 | 880.4 | 950.9 | 1010.9 | 1015.2 | *1005.1* | 955.7 | 842.0 |
| 20° | 738.4 | 740.8 | 760.4 | 806.0 | 877.5 | 969.6 | 1064.6 | 1105.4 | *1094.4* | 1042.6 | 905.3 |
| 22.5° | 751.3 | 753.3 | 766.2 | 801.7 | 867.9 | 980.2 | 1114.5 | 1195.6 | *1189.4* | 1135.6 | 972.0 |
| 25° | 819.5 | 825.7 | 818.0 | 824.3 | 872.2 | 985.9 | 1154.8 | 1285.8 | *1287.2* | 1233.0 | 1041.1 |
| 27.5° | 957.6 | 949.5 | 931.2 | 900.1 | 905.8 | 1001.3 | 1189.4 | 1370.7 | *1383.2* | 1328.0 | 1102.5 |
| 30° | 1098.2 | 1093.4 | 1082.4 | 1033.9 | 993.6 | 1035.4 | 1218.6 | 1457.6 | *1477.2* | 1421.6 | 1157.2 |
| 32.5° | 1256.1 | 1260.9 | 1241.2 | 1183.1 | 1114.5 | 1104.4 | 1248.9 | 1540.1 | *1577.0* | 1527.6 | 1221.5 |
| 35° | 1444.6 | 1446.0 | 1407.2 | 1342.9 | 1265.2 | 1218.6 | 1303.1 | 1631.2 | *1699.4* | 1662.9 | 1307.4 |
| 37.5° | 1628.4 | 1637.0 | 1615.9 | 1514.7 | 1445.6 | 1360.6 | 1392.8 | 1748.3 | *1844.3* | 1829.9 | 1415.3 |
| 40° | 1791.0 | 1804.4 | 1797.7 | 1699.9 | 1609.2 | 1537.7 | 1531.9 | 1885.5 | *2019.4* | 2035.7 | 1557.8 |
| 42.5° | 1920.5 | 1929.2 | 1934.5 | 1864.9 | 1784.8 | 1744.5 | 1703.7 | 2044.8 | *2226.2* | 2292.9 | 1732.5 |
| 45° | 2057.3 | 2060.2 | 2071.2 | 2024.2 | 1954.1 | 1957.5 | 1906.6 | 2238.2 | *2444.0* | 2577.8 | 1933.0 |
| 47.5° | 2231.4 | 2241.0 | 2235.8 | 2186.3 | 2123.0 | 2160.9 | 2116.3 | 2437.3 | *2658.9* | 2882.0 | 2138.4 |
| 50° | 2443.5 | 2453.6 | 2448.8 | 2391.2 | 2320.7 | 2336.5 | 2308.7 | 2630.6 | *2866.2* | 3168.9 | 2309.2 |
| 52.5° | 2552.9 | 2561.1 | 2620.5 | 2646.5 | 2609.5 | 2508.8 | 2472.8 | 2843.2 | *3041.3* | 3405.0 | 2466.1 |
| 55° | 2500.1 | 2505.9 | 2635.4 | 2744.8 | 2880.1 | 2779.3 | 2637.8 | 3007.2 | *3195.8* | 3589.2 | 2582.6 |
| 57.5° | 2281.3 | 2312.5 | 2488.6 | 2673.8 | 2958.3 | 3046.6 | 2905.5 | 3185.7 | *3344.5* | 3717.3 | 2697.3 |
| 60° | 1832.7 | 1831.3 | 2083.7 | 2416.2 | 2805.7 | 3120.0 | 3283.6 | 3427.0 | *3493.7* | 3815.7 | 2850.8 |
| 62.5° | 1012.8 | 1021.9 | 1357.8 | 1795.8 | 2381.6 | 2930.0 | 3567.1 | 3844.0 | *3833.9* | 3987.4 | 3091.2 |
| 65° | 504.2 | 522.5 | 704.8 | 1028.6 | 1584.7 | 2421.4 | 3616.1 | 4480.2 | *4451.4* | 4391.9 | 3587.8 |
| 67.5° | *320.0* | *327.2* | *428.0* | *597.8* | *880.9* | *1556.4* | *3311.4* | *4954.7* | *5021.3* | *4871.7* | *4080.5* |
| 70° | 207.3 | 219.3 | 297.5 | 408.8 | 531.6 | 802.2 | 2425.8 | 4647.1 | *4800.2* | 4818.9 | 3773.4 |
| 72.5° | 112.7 | 121.4 | 190.0 | 291.7 | 383.8 | 401.1 | 1362.6 | 3487.5 | *3733.6* | 4087.7 | 2952.1 |
| 75° | 64.3 | 70.5 | 104.1 | 198.1 | 281.6 | 244.2 | 604.0 | 2334.6 | *2491.5* | 2921.4 | 2115.3 |
| 77.5° | 38.9 | 44.1 | 58.5 | 96.4 | 176.6 | 163.1 | 228.4 | 1421.1 | *1520.9* | 1743.0 | 1110.2 |
| 80° | 17.8 | 21.1 | 36.9 | 53.3 | 96.4 | 77.2 | 87.3 | 662.6 | *684.2* | 715.3 | 367.5 |
| 82.5° | 8.2 | 9.6 | 16.8 | 31.7 | 54.7 | 44.6 | 33.6 | 153.0 | *215.4* | 203.9 | 93.6 |
| 85° | 1.0 | 1.0 | 6.2 | 13.0 | 15.4 | 11.5 | 13.9 | 34.5 | *43.7* | 61.4 | 26.9 |
| 87.5° | 0.0 | 0.0 | 0.5 | 0.5 | 1.0 | 1.4 | 2.9 | 4.3 | *6.2* | 10.1 | 6.7 |
| 90° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | *0.0* | 0.0 | 0.0 |

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Scaled Data Report

REPORT NUMBER: P631560
CATALOG NUMBER: GWS-SA1F-830-U-T2-W-HSS

**CANDELA DISTRIBUTION (continued):**

| | 90° | 95° | 105° | 115° | 125° | 135° | 145° | 155° | 165° | 175° | 180° |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0° | 583.4 | 583.4 | 583.4 | 583.4 | 583.4 | 583.4 | 583.4 | 583.4 | 583.4 | 583.4 | 583.4 |
| 2.5° | 592.5 | 579.1 | 567.1 | 549.3 | 537.4 | 523.9 | 514.8 | 503.8 | 499.4 | 496.1 | 491.3 |
| 5° | 606.0 | 584.4 | 555.1 | 522.5 | 495.6 | 470.2 | 446.7 | 431.3 | 417.9 | 416.0 | 409.2 |
| 7.5° | 628.0 | 595.9 | 546.5 | 493.2 | 447.6 | 405.4 | 372.3 | 345.4 | 332.0 | 327.7 | 320.0 |
| 10° | 657.3 | 613.2 | 533.5 | 452.0 | 386.2 | 335.8 | 298.4 | 268.2 | 247.1 | 239.4 | 233.7 |
| 12.5° | 689.9 | 629.0 | 512.9 | 401.1 | 326.2 | 268.7 | 221.2 | 189.0 | 175.6 | 170.8 | 166.5 |
| 15° | 727.3 | 643.9 | 480.3 | 350.2 | 267.7 | 197.7 | 164.1 | 150.2 | 144.4 | 143.0 | 141.5 |
| 17.5° | 763.3 | 653.5 | 441.4 | 297.5 | 205.8 | 153.5 | 137.7 | 132.4 | 131.0 | 129.5 | 128.6 |
| 20° | 804.1 | 660.2 | 395.8 | 247.6 | 159.8 | 130.0 | 122.3 | 118.5 | 115.6 | 112.7 | 112.3 |
| 22.5° | 845.8 | 660.2 | 346.4 | 198.6 | 133.9 | 116.6 | 107.9 | 100.8 | 95.5 | 92.6 | 91.6 |
| 25° | 885.7 | 651.1 | 297.5 | 158.8 | 118.0 | 103.6 | 92.6 | 84.4 | 77.2 | 73.9 | 72.9 |
| 27.5° | 914.0 | 627.5 | 254.8 | 134.3 | 107.0 | 92.1 | 78.7 | 69.6 | 63.8 | 60.5 | 60.0 |
| 30° | 931.7 | 592.5 | 215.4 | 119.9 | 97.4 | 80.1 | 66.7 | 59.0 | 54.7 | 52.3 | 51.3 |
| 32.5° | 945.2 | 549.3 | 180.4 | 109.9 | 88.3 | 69.6 | 58.1 | 51.8 | 48.0 | 46.1 | 45.6 |
| 35° | 972.0 | 508.6 | 154.5 | 100.8 | 78.7 | 60.9 | 50.9 | 46.1 | 43.2 | 40.8 | 40.3 |
| 37.5° | 1009.5 | 474.5 | 133.9 | 92.6 | 69.6 | 54.2 | 46.1 | 41.7 | 39.3 | 36.9 | 36.5 |
| 40° | 1064.6 | 452.9 | 118.5 | 84.4 | 61.4 | 48.9 | 42.2 | 38.4 | 35.0 | 32.6 | 32.1 |
| 42.5° | 1149.5 | 442.8 | 108.4 | 76.3 | 54.2 | 44.1 | 38.9 | 34.1 | 30.7 | 28.3 | 27.8 |
| 45° | 1250.8 | 448.1 | 99.8 | 68.1 | 49.4 | 40.8 | 34.5 | 29.7 | 26.4 | 24.0 | 23.5 |
| 47.5° | 1359.2 | 466.8 | 92.6 | 60.5 | 44.6 | 37.4 | 30.7 | 25.4 | 22.5 | 20.2 | 19.7 |
| 50° | 1472.4 | 497.5 | 86.4 | 53.3 | 40.8 | 33.6 | 26.4 | 22.1 | 19.2 | 17.3 | 16.8 |
| 52.5° | 1570.8 | 539.3 | 80.1 | 48.0 | 37.4 | 29.7 | 23.0 | 19.2 | 16.3 | 14.4 | 13.9 |
| 55° | 1664.8 | 578.6 | 75.3 | 43.2 | 33.6 | 25.9 | 20.2 | 16.3 | 13.9 | 12.0 | 11.5 |
| 57.5° | 1767.0 | 620.4 | 69.6 | 38.9 | 30.2 | 23.0 | 17.8 | 13.9 | 12.0 | 10.1 | 9.6 |
| 60° | 1915.8 | 682.2 | 60.9 | 35.5 | 26.4 | 20.2 | 15.4 | 12.5 | 10.6 | 8.2 | 7.7 |
| 62.5° | 2130.2 | 795.0 | 51.3 | 30.7 | 22.5 | 17.3 | 13.0 | 10.6 | 8.6 | 6.7 | 5.8 |
| 65° | 2531.3 | 986.9 | 42.2 | 25.4 | 18.2 | 14.4 | 11.0 | 8.6 | 6.7 | 4.8 | 4.3 |
| 67.5° | *2820.1* | *1036.8* | *34.1* | *20.6* | *14.9* | *11.0* | *9.1* | *6.7* | *4.8* | *3.4* | *2.9* |
| 70° | 2465.6 | 744.6 | 26.4 | 16.8 | 12.5 | 8.6 | 7.2 | 5.3 | 3.4 | 2.4 | 1.9 |
| 72.5° | 1857.7 | 486.5 | 19.7 | 13.0 | 9.6 | 7.2 | 5.3 | 4.3 | 2.9 | 1.9 | 1.4 |
| 75° | 1309.3 | 281.1 | 14.4 | 9.6 | 6.7 | 5.3 | 4.3 | 3.4 | 2.4 | 1.4 | 1.4 |
| 77.5° | 671.2 | 116.1 | 10.1 | 6.7 | 4.8 | 3.4 | 2.9 | 1.9 | 1.9 | 1.4 | 1.0 |
| 80° | 203.9 | 38.4 | 5.8 | 4.3 | 3.4 | 2.4 | 1.4 | 1.4 | 1.4 | 1.0 | 0.5 |
| 82.5° | 46.5 | 12.5 | 3.4 | 3.4 | 2.4 | 1.9 | 1.4 | 0.5 | 0.5 | 0.0 | 0.0 |
| 85° | 12.0 | 3.8 | 2.9 | 2.4 | 2.4 | 1.9 | 1.0 | 0.5 | 0.0 | 0.0 | 0.0 |
| 87.5° | 4.3 | 2.4 | 2.4 | 2.4 | 1.9 | 1.4 | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 90° | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

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# LM-79-2019: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

MCGRAW EDISON

Report Number: SP1-2408-195-9

Test Date: 08/07/2024

Luminaire Tested: GALN-SB1A-830-U-5WQ

Data in this report applies to families of products including GALN-SB1A-830-U-5WQ.

Report Generated By FNC07603 / LDUCLS01DT446
Version: v7.04

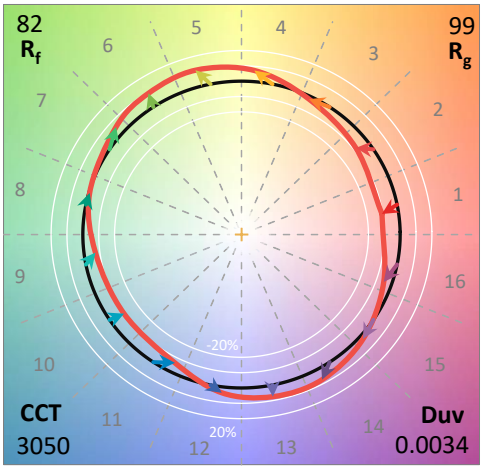
## Test Information

| | |
|---|---|
| Test Method: | LM-79-2019 |
| Report Number: | SP1-2408-195-9 |
| Test Lab: | COOPER LIGHTING SOLUTIONS |
| Photometer: | SP1 - 76IN SPHERE |
| Measurement Geometry: | 4π |
| Issue Date: | 08/07/2024 |
| Manufacturer: | COOPER LIGHTING SOLUTIONS |
| Product Line: | MCGRAW EDISON |
| Catalog Number: | **GALN-SB1A-830-U-5WQ** |
| Description: | GALLEON AREA AND ROADWAY LUMINAIRE. (1) 80 CRI, 3000K, 350MA HIGH DENSITY LIGHTSQUARE WITH 26 LEDS AND TYPE V WIDE OPTICS |

## Spectral Parameters

| | | | | | |
|---|---|---|---|---|---|
| CCT (K): | 3050 | CRI (Ra): | 81.0 | | |
| CIE u': | 0.2476 | R1: | 79.6 | R9: | 7.1 |
| CIE v': | 0.5251 | R2: | 85.6 | R10: | 67.0 |
| Duv: | 0.0034 | R3: | 92.0 | R11: | 82.7 |
| CIE x: | 0.4383 | R4: | 82.6 | R12: | 63.2 |
| CIE y: | 0.4131 | R5: | 78.9 | R13: | 80.3 |
| CIE z: | 0.1487 | R6: | 81.7 | R14: | 95.0 |
| Peak Wavelength (nm): | 603 | R7: | 85.2 | R15: | 71.7 |
| Dominant Wavelength (nm): | 581 | R8: | 62.0 | | |
| Purity: | 55.55201 | | | | |

| | |
|---|---|
| Rf: | 81.5 |
| Rg: | 99.2 |




## Test Conditions

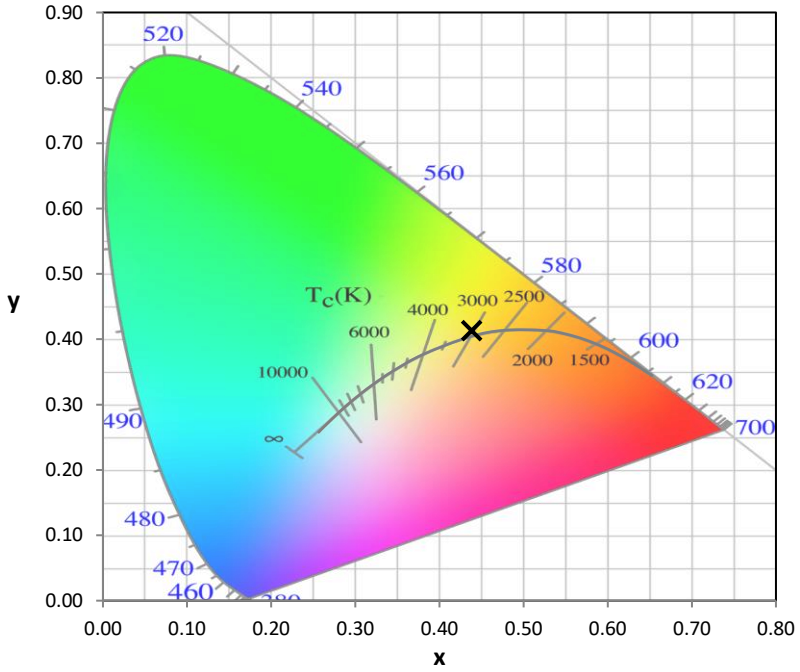
| | |
|---|---|
| Stabilization Time: | 20M |
| Operation Time: | 1H 20M |
| Sphere Temperature (°C): | 24.2 |

REPORT NUMBER: SP1-2408-195-9

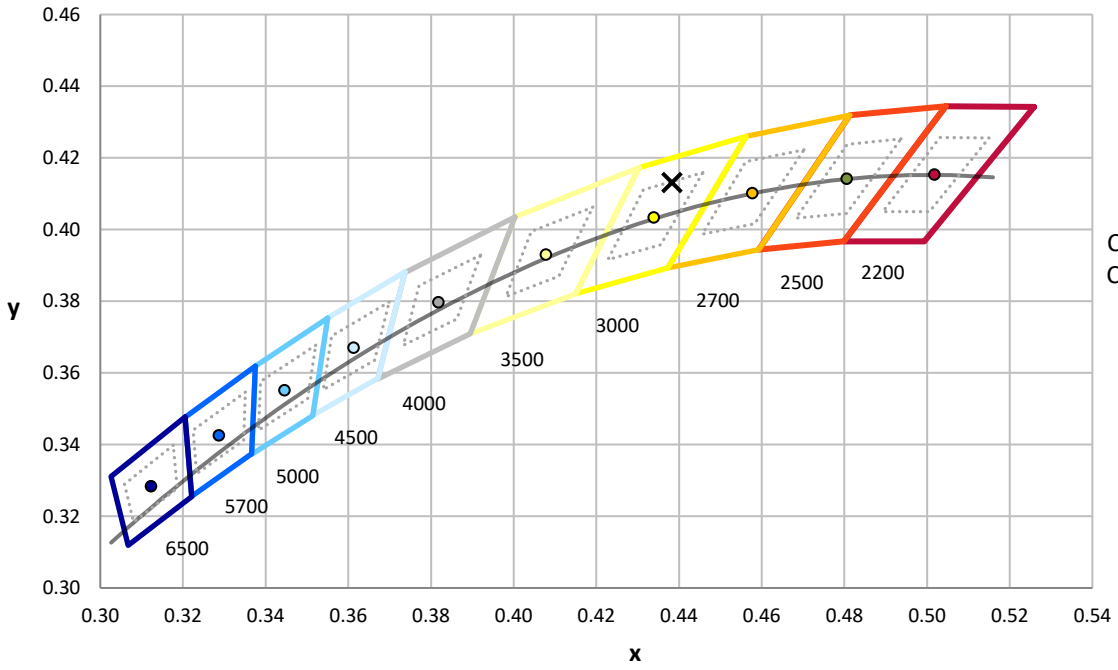
| Measurement and Test Equipment | | | |
|---|---|---|---|
| Instrument | Identification Number | Calibration Date | Calibration Due Date |
| Photometer | IN0058 | 6/18/2024 | 12/18/2024 |
| Power Meter | INXT2011004 | 2/8/2024 | 2/8/2025 |
| AC Power Source | IN0063 | 10/24/2023 | 10/24/2024 |
| DC Power Source | IN0208 | 10/24/2023 | 10/24/2024 |
| Sphere Thermometer | IN0085 | 10/24/2023 | 10/24/2024 |
| Room Thermometer | IN0046 | 10/24/2023 | 10/24/2024 |

REPORT NUMBER: SP1-2408-195-9

## CIE 1931 Chromaticity Diagram




## CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles




CCT = 3050K
CIE x = 0.4383
CIE y = 0.4131
Duv = 0.0034

Point lies inside the ANSI 3000K 4-step quadrangle

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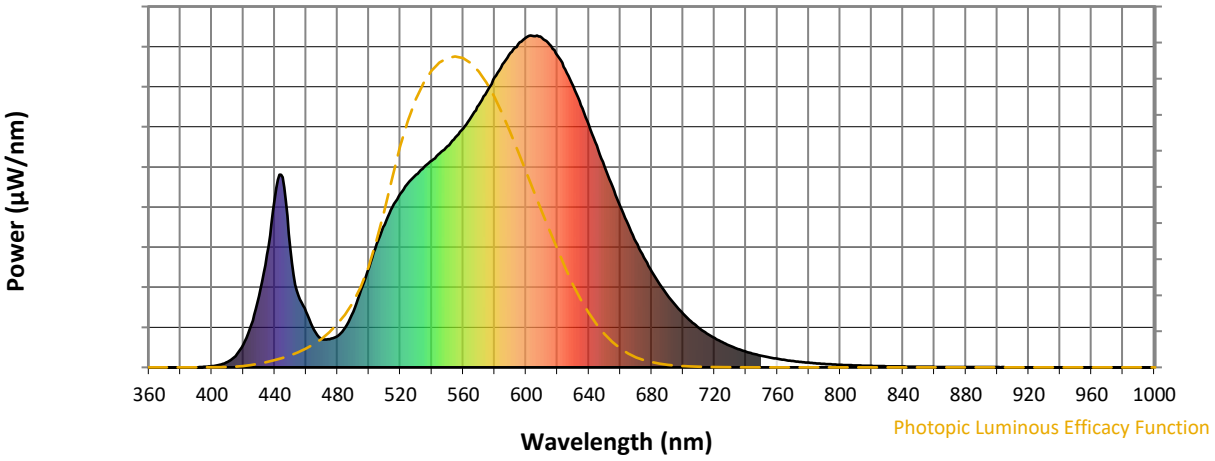
## Photopic Flux vs. Wavelength




## Photopic Lumens: NR

| λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 360 | 0 | NR | 490 | 168 | NR | 620 | 940 | NR | 750 | 35 | NR | 880 | 1 | NR |
| 365 | 0 | NR | 495 | 233 | NR | 625 | 897 | NR | 755 | 30 | NR | 885 | 1 | NR |
| 370 | 0 | NR | 500 | 300 | NR | 630 | 847 | NR | 760 | 26 | NR | 890 | 1 | NR |
| 375 | 0 | NR | 505 | 372 | NR | 635 | 790 | NR | 765 | 22 | NR | 895 | 1 | NR |
| 380 | 0 | NR | 510 | 430 | NR | 640 | 730 | NR | 770 | 19 | NR | 900 | 1 | NR |
| 385 | 0 | NR | 515 | 483 | NR | 645 | 668 | NR | 775 | 16 | NR | 905 | 1 | NR |
| 390 | 0 | NR | 520 | 524 | NR | 650 | 605 | NR | 780 | 14 | NR | 910 | 0 | NR |
| 395 | 2 | NR | 525 | 555 | NR | 655 | 545 | NR | 785 | 12 | NR | 915 | 0 | NR |
| 400 | 4 | NR | 530 | 581 | NR | 660 | 485 | NR | 790 | 10 | NR | 920 | 0 | NR |
| 405 | 7 | NR | 535 | 604 | NR | 665 | 430 | NR | 795 | 9 | NR | 925 | 0 | NR |
| 410 | 17 | NR | 540 | 623 | NR | 670 | 378 | NR | 800 | 8 | NR | 930 | 0 | NR |
| 415 | 34 | NR | 545 | 645 | NR | 675 | 331 | NR | 805 | 7 | NR | 935 | 0 | NR |
| 420 | 68 | NR | 550 | 667 | NR | 680 | 290 | NR | 810 | 6 | NR | 940 | 0 | NR |
| 425 | 128 | NR | 555 | 693 | NR | 685 | 251 | NR | 815 | 5 | NR | 945 | 0 | NR |
| 430 | 214 | NR | 560 | 719 | NR | 690 | 218 | NR | 820 | 4 | NR | 950 | 0 | NR |
| 435 | 339 | NR | 565 | 754 | NR | 695 | 188 | NR | 825 | 4 | NR | 955 | 0 | NR |
| 440 | 507 | NR | 570 | 791 | NR | 700 | 162 | NR | 830 | 3 | NR | 960 | 0 | NR |
| 445 | 573 | NR | 575 | 830 | NR | 705 | 139 | NR | 835 | 3 | NR | 965 | 0 | NR |
| 450 | 356 | NR | 580 | 873 | NR | 710 | 119 | NR | 840 | 3 | NR | 970 | 0 | NR |
| 455 | 217 | NR | 585 | 913 | NR | 715 | 102 | NR | 845 | 2 | NR | 975 | 0 | NR |
| 460 | 168 | NR | 590 | 948 | NR | 720 | 88 | NR | 850 | 2 | NR | 980 | 0 | NR |
| 465 | 113 | NR | 595 | 974 | NR | 725 | 76 | NR | 855 | 2 | NR | 985 | 0 | NR |
| 470 | 85 | NR | 600 | 994 | NR | 730 | 65 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 85 | NR | 605 | 998 | NR | 735 | 55 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 94 | NR | 610 | 994 | NR | 740 | 47 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 120 | NR | 615 | 973 | NR | 745 | 41 | NR | 875 | 1 | NR | | | |

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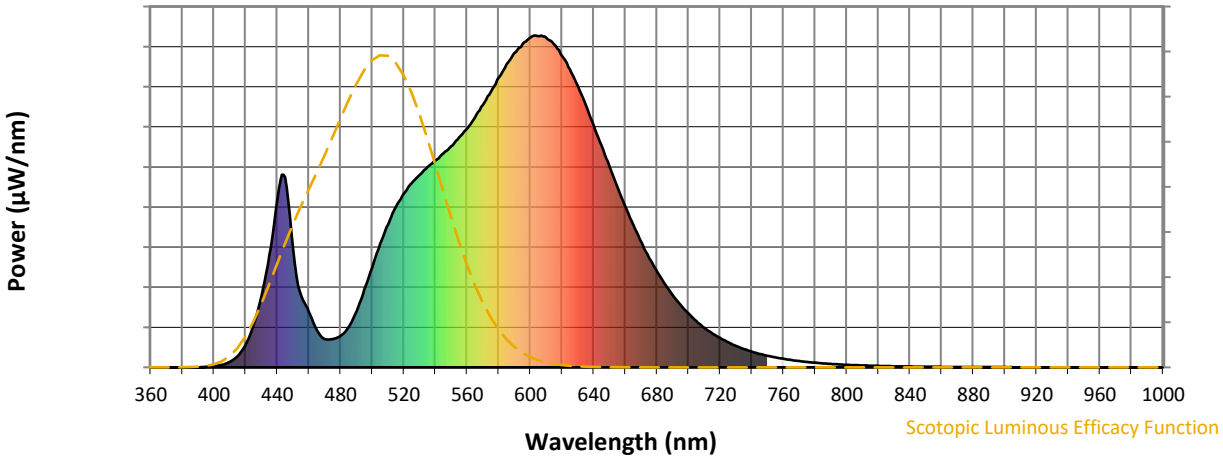
## Scotopic Flux vs. Wavelength




**Scotopic Lumens: NR** **S/P: 1.27**

| λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 360 | 0 | NR | 490 | 168 | NR | 620 | 940 | NR | 750 | 35 | NR | 880 | 1 | NR |
| 365 | 0 | NR | 495 | 233 | NR | 625 | 897 | NR | 755 | 30 | NR | 885 | 1 | NR |
| 370 | 0 | NR | 500 | 300 | NR | 630 | 847 | NR | 760 | 26 | NR | 890 | 1 | NR |
| 375 | 0 | NR | 505 | 372 | NR | 635 | 790 | NR | 765 | 22 | NR | 895 | 1 | NR |
| 380 | 0 | NR | 510 | 430 | NR | 640 | 730 | NR | 770 | 19 | NR | 900 | 1 | NR |
| 385 | 0 | NR | 515 | 483 | NR | 645 | 668 | NR | 775 | 16 | NR | 905 | 1 | NR |
| 390 | 0 | NR | 520 | 524 | NR | 650 | 605 | NR | 780 | 14 | NR | 910 | 0 | NR |
| 395 | 2 | NR | 525 | 555 | NR | 655 | 545 | NR | 785 | 12 | NR | 915 | 0 | NR |
| 400 | 4 | NR | 530 | 581 | NR | 660 | 485 | NR | 790 | 10 | NR | 920 | 0 | NR |
| 405 | 7 | NR | 535 | 604 | NR | 665 | 430 | NR | 795 | 9 | NR | 925 | 0 | NR |
| 410 | 17 | NR | 540 | 623 | NR | 670 | 378 | NR | 800 | 8 | NR | 930 | 0 | NR |
| 415 | 34 | NR | 545 | 645 | NR | 675 | 331 | NR | 805 | 7 | NR | 935 | 0 | NR |
| 420 | 68 | NR | 550 | 667 | NR | 680 | 290 | NR | 810 | 6 | NR | 940 | 0 | NR |
| 425 | 128 | NR | 555 | 693 | NR | 685 | 251 | NR | 815 | 5 | NR | 945 | 0 | NR |
| 430 | 214 | NR | 560 | 719 | NR | 690 | 218 | NR | 820 | 4 | NR | 950 | 0 | NR |
| 435 | 339 | NR | 565 | 754 | NR | 695 | 188 | NR | 825 | 4 | NR | 955 | 0 | NR |
| 440 | 507 | NR | 570 | 791 | NR | 700 | 162 | NR | 830 | 3 | NR | 960 | 0 | NR |
| 445 | 573 | NR | 575 | 830 | NR | 705 | 139 | NR | 835 | 3 | NR | 965 | 0 | NR |
| 450 | 356 | NR | 580 | 873 | NR | 710 | 119 | NR | 840 | 3 | NR | 970 | 0 | NR |
| 455 | 217 | NR | 585 | 913 | NR | 715 | 102 | NR | 845 | 2 | NR | 975 | 0 | NR |
| 460 | 168 | NR | 590 | 948 | NR | 720 | 88 | NR | 850 | 2 | NR | 980 | 0 | NR |
| 465 | 113 | NR | 595 | 974 | NR | 725 | 76 | NR | 855 | 2 | NR | 985 | 0 | NR |
| 470 | 85 | NR | 600 | 994 | NR | 730 | 65 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 85 | NR | 605 | 998 | NR | 735 | 55 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 94 | NR | 610 | 994 | NR | 740 | 47 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 120 | NR | 615 | 973 | NR | 745 | 41 | NR | 875 | 1 | NR | | | |

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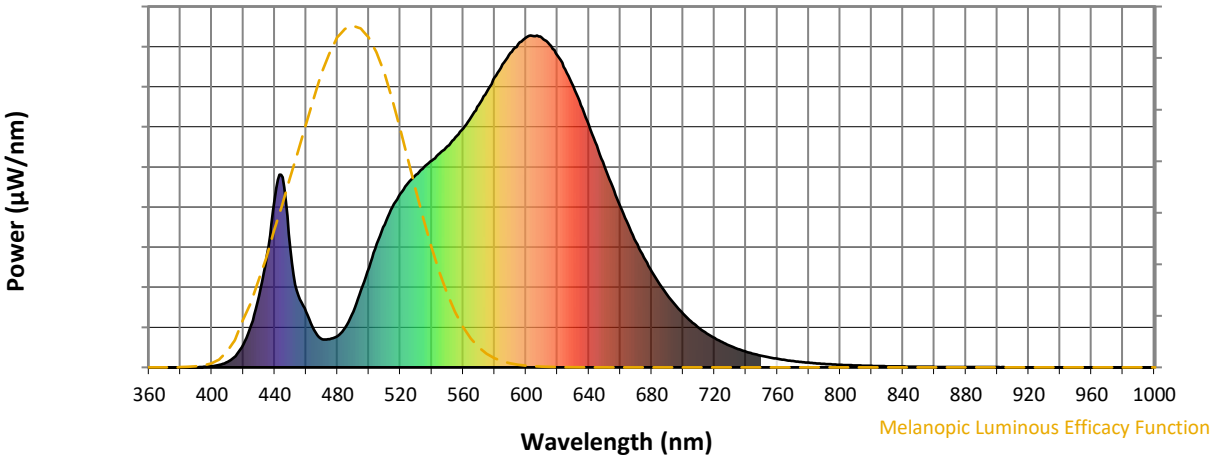
## Melanopic Flux vs. Wavelength




**Melanopic Lumens: NR** **M/P: 2.32**

| λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) | λ (nm) | Power W^/nm | Lumens (ϕ/nm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 360 | 0 | NR | 490 | 168 | NR | 620 | 940 | NR | 750 | 35 | NR | 880 | 1 | NR |
| 365 | 0 | NR | 495 | 233 | NR | 625 | 897 | NR | 755 | 30 | NR | 885 | 1 | NR |
| 370 | 0 | NR | 500 | 300 | NR | 630 | 847 | NR | 760 | 26 | NR | 890 | 1 | NR |
| 375 | 0 | NR | 505 | 372 | NR | 635 | 790 | NR | 765 | 22 | NR | 895 | 1 | NR |
| 380 | 0 | NR | 510 | 430 | NR | 640 | 730 | NR | 770 | 19 | NR | 900 | 1 | NR |
| 385 | 0 | NR | 515 | 483 | NR | 645 | 668 | NR | 775 | 16 | NR | 905 | 1 | NR |
| 390 | 0 | NR | 520 | 524 | NR | 650 | 605 | NR | 780 | 14 | NR | 910 | 0 | NR |
| 395 | 2 | NR | 525 | 555 | NR | 655 | 545 | NR | 785 | 12 | NR | 915 | 0 | NR |
| 400 | 4 | NR | 530 | 581 | NR | 660 | 485 | NR | 790 | 10 | NR | 920 | 0 | NR |
| 405 | 7 | NR | 535 | 604 | NR | 665 | 430 | NR | 795 | 9 | NR | 925 | 0 | NR |
| 410 | 17 | NR | 540 | 623 | NR | 670 | 378 | NR | 800 | 8 | NR | 930 | 0 | NR |
| 415 | 34 | NR | 545 | 645 | NR | 675 | 331 | NR | 805 | 7 | NR | 935 | 0 | NR |
| 420 | 68 | NR | 550 | 667 | NR | 680 | 290 | NR | 810 | 6 | NR | 940 | 0 | NR |
| 425 | 128 | NR | 555 | 693 | NR | 685 | 251 | NR | 815 | 5 | NR | 945 | 0 | NR |
| 430 | 214 | NR | 560 | 719 | NR | 690 | 218 | NR | 820 | 4 | NR | 950 | 0 | NR |
| 435 | 339 | NR | 565 | 754 | NR | 695 | 188 | NR | 825 | 4 | NR | 955 | 0 | NR |
| 440 | 507 | NR | 570 | 791 | NR | 700 | 162 | NR | 830 | 3 | NR | 960 | 0 | NR |
| 445 | 573 | NR | 575 | 830 | NR | 705 | 139 | NR | 835 | 3 | NR | 965 | 0 | NR |
| 450 | 356 | NR | 580 | 873 | NR | 710 | 119 | NR | 840 | 3 | NR | 970 | 0 | NR |
| 455 | 217 | NR | 585 | 913 | NR | 715 | 102 | NR | 845 | 2 | NR | 975 | 0 | NR |
| 460 | 168 | NR | 590 | 948 | NR | 720 | 88 | NR | 850 | 2 | NR | 980 | 0 | NR |
| 465 | 113 | NR | 595 | 974 | NR | 725 | 76 | NR | 855 | 2 | NR | 985 | 0 | NR |
| 470 | 85 | NR | 600 | 994 | NR | 730 | 65 | NR | 860 | 1 | NR | 990 | 0 | NR |
| 475 | 85 | NR | 605 | 998 | NR | 735 | 55 | NR | 865 | 1 | NR | 995 | 0 | NR |
| 480 | 94 | NR | 610 | 994 | NR | 740 | 47 | NR | 870 | 1 | NR | 1000 | 0 | NR |
| 485 | 120 | NR | 615 | 973 | NR | 745 | 41 | NR | 875 | 1 | NR | | | |

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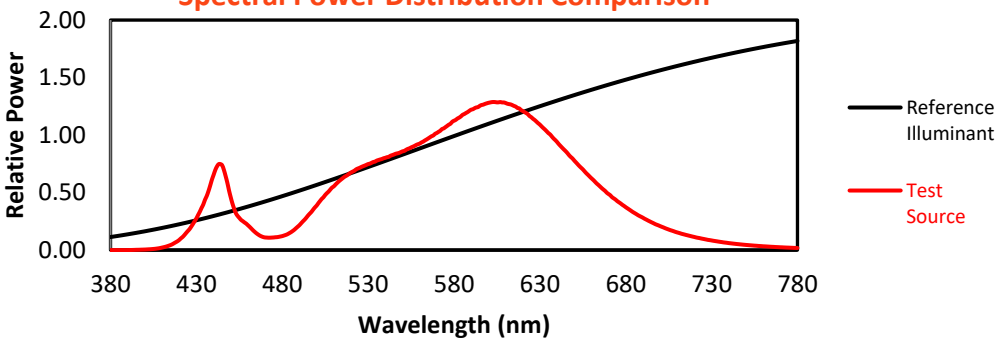
# TM-30-18

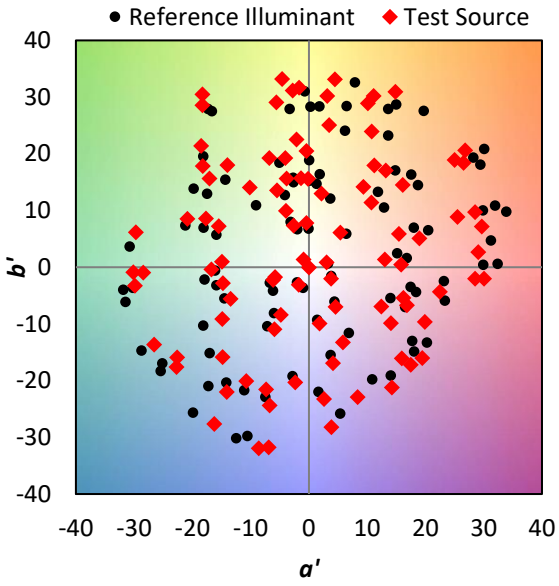
## Summary

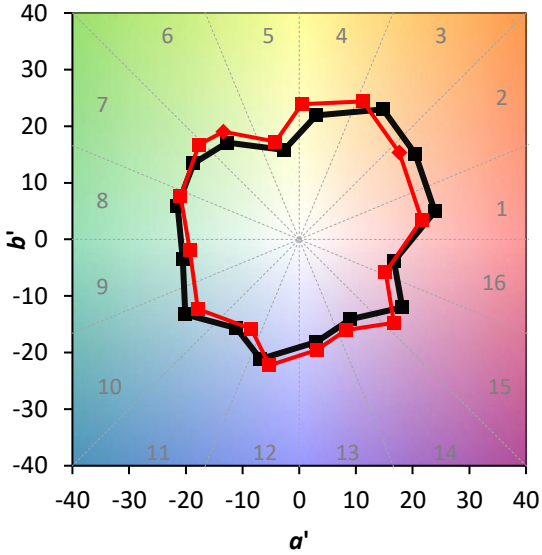
$R_f$ = 81.5
$R_g$ = 99.2
CIE $R_a$ = 81.0
$R_9$ = 7.1

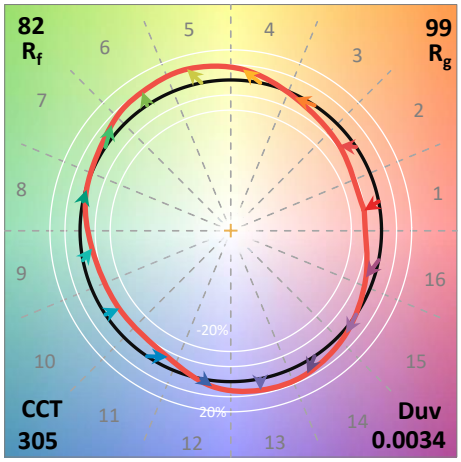
## Spectral Power Distribution Comparison

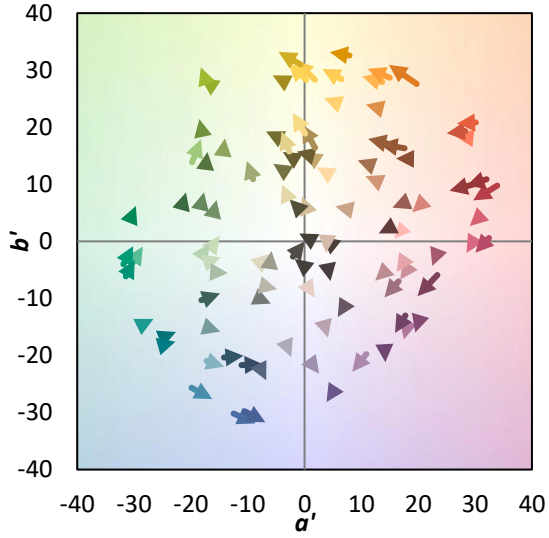



## Color Vector Graphics



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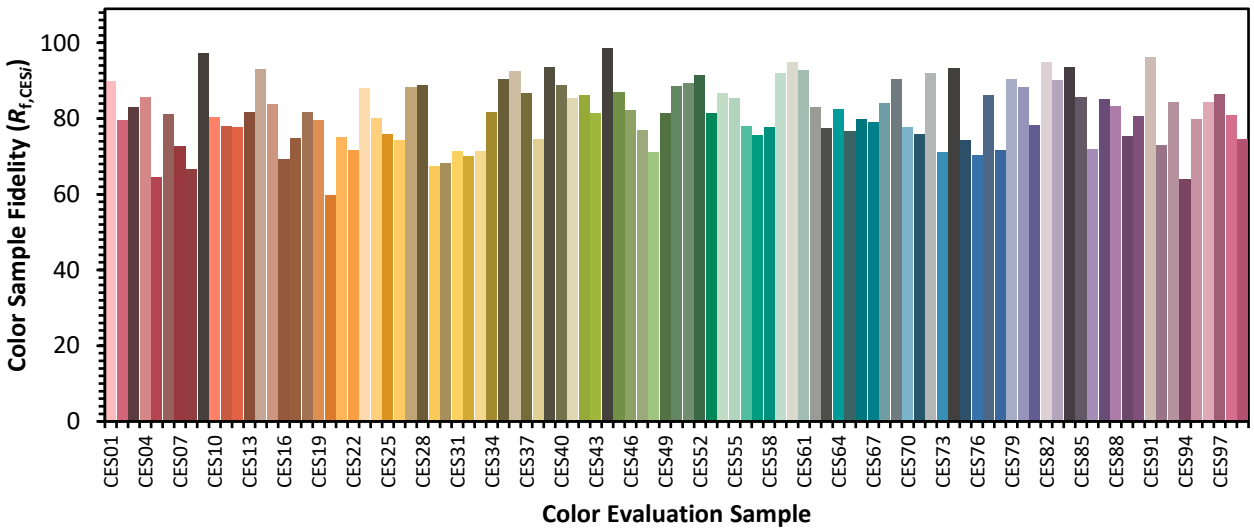
# TM-30-18

**Individual Sample Fidelity Index ($R_{f,i}$)**

| | | | |
|---|---|---|---|
| CES01 = 86 | CES26 = 74 | CES51 = 89 | CES76 = 70 |
| CES02 = 63 | CES27 = 88 | CES52 = 92 | CES77 = 86 |
| CES03 = 31 | CES28 = 89 | CES53 = 81 | CES78 = 72 |
| CES04 = 70 | CES29 = 67 | CES54 = 87 | CES79 = 90 |
| CES05 = 50 | CES30 = 68 | CES55 = 85 | CES80 = 88 |
| CES06 = 51 | CES31 = 71 | CES56 = 78 | CES81 = 78 |
| CES07 = 42 | CES32 = 70 | CES57 = 76 | CES82 = 95 |
| CES08 = 41 | CES33 = 71 | CES58 = 78 | CES83 = 90 |
| CES09 = 29 | CES34 = 82 | CES59 = 92 | CES84 = 94 |
| CES10 = 76 | CES35 = 90 | CES60 = 95 | CES85 = 86 |
| CES11 = 59 | CES36 = 93 | CES61 = 93 | CES86 = 72 |
| CES12 = 65 | CES37 = 87 | CES62 = 83 | CES87 = 85 |
| CES13 = 43 | CES38 = 75 | CES63 = 77 | CES88 = 83 |
| CES14 = 74 | CES39 = 94 | CES64 = 83 | CES89 = 75 |
| CES15 = 71 | CES40 = 89 | CES65 = 77 | CES90 = 81 |
| CES16 = 47 | CES41 = 85 | CES66 = 80 | CES91 = 96 |
| CES17 = 50 | CES42 = 86 | CES67 = 79 | CES92 = 73 |
| CES18 = 56 | CES43 = 81 | CES68 = 84 | CES93 = 84 |
| CES19 = 72 | CES44 = 99 | CES69 = 91 | CES94 = 64 |
| CES20 = 66 | CES45 = 87 | CES70 = 78 | CES95 = 80 |
| CES21 = 87 | CES46 = 82 | CES71 = 76 | CES96 = 84 |
| CES22 = 79 | CES47 = 77 | CES72 = 92 | CES97 = 87 |
| CES23 = 92 | CES48 = 71 | CES73 = 71 | CES98 = 81 |
| CES24 = 91 | CES49 = 81 | CES74 = 93 | CES99 = 74 |
| CES25 = 72 | CES50 = 89 | CES75 = 74 | |



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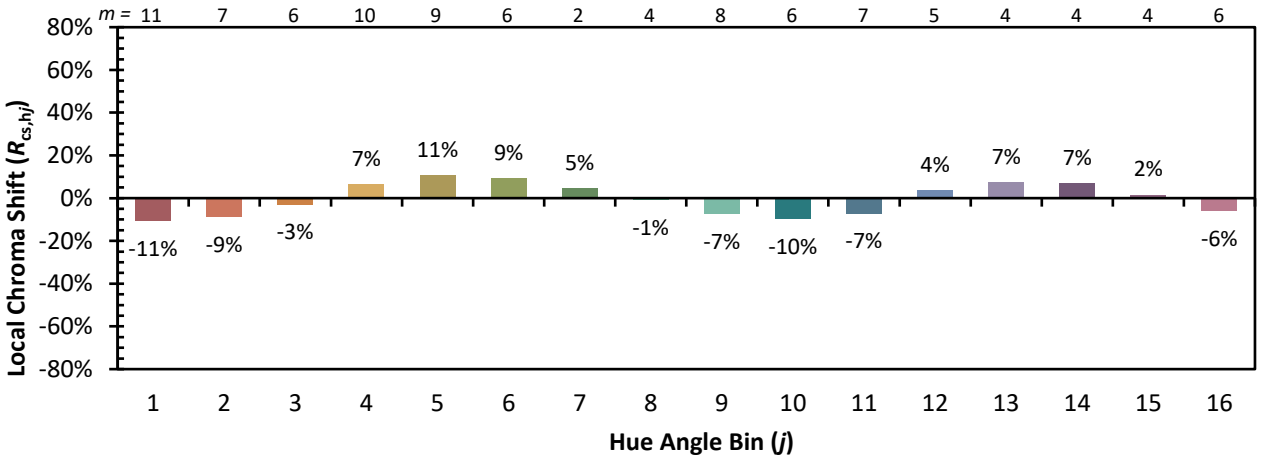
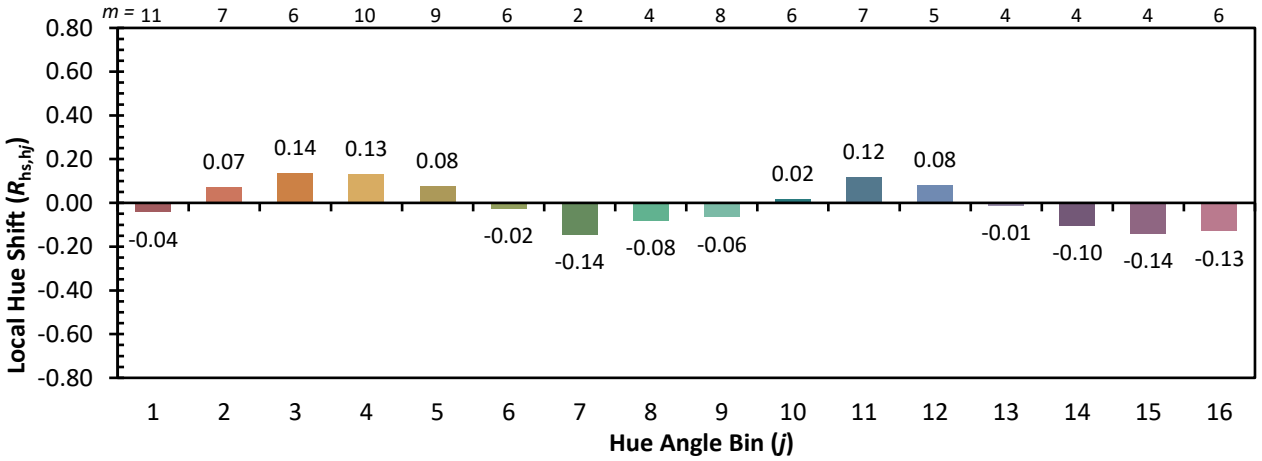
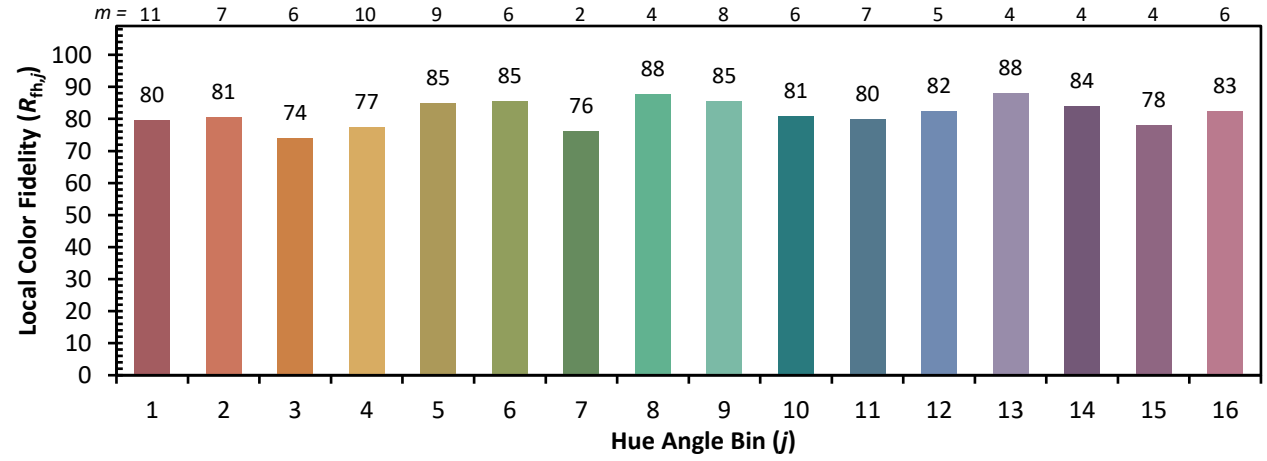
## Color Rendition by Hue-Angle Bin



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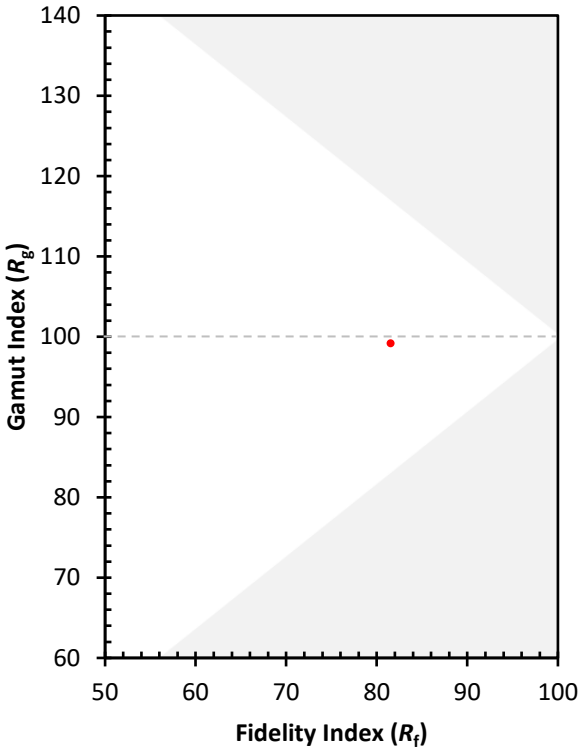
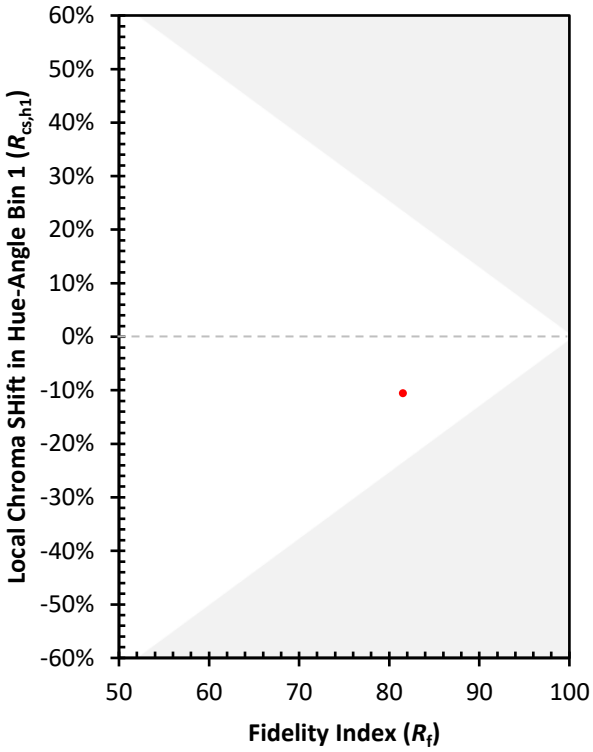
## TM-30-18

### Measure Comparisons

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